

Midterm 2 Review

Announcements

- First question on test was graded wrong
- Quizzes should be visible

How Did You Do in the Vowel Counting Task?

New Words

corvette ?

asbestos ?

hexagon ?

Old Words from Vowel Counting

clarinet ?

tequila ?

ellipse ?

- Increased likelihood of solving the fragments if the words had been studied.
- Example of implicit memory or what is sometimes called priming.

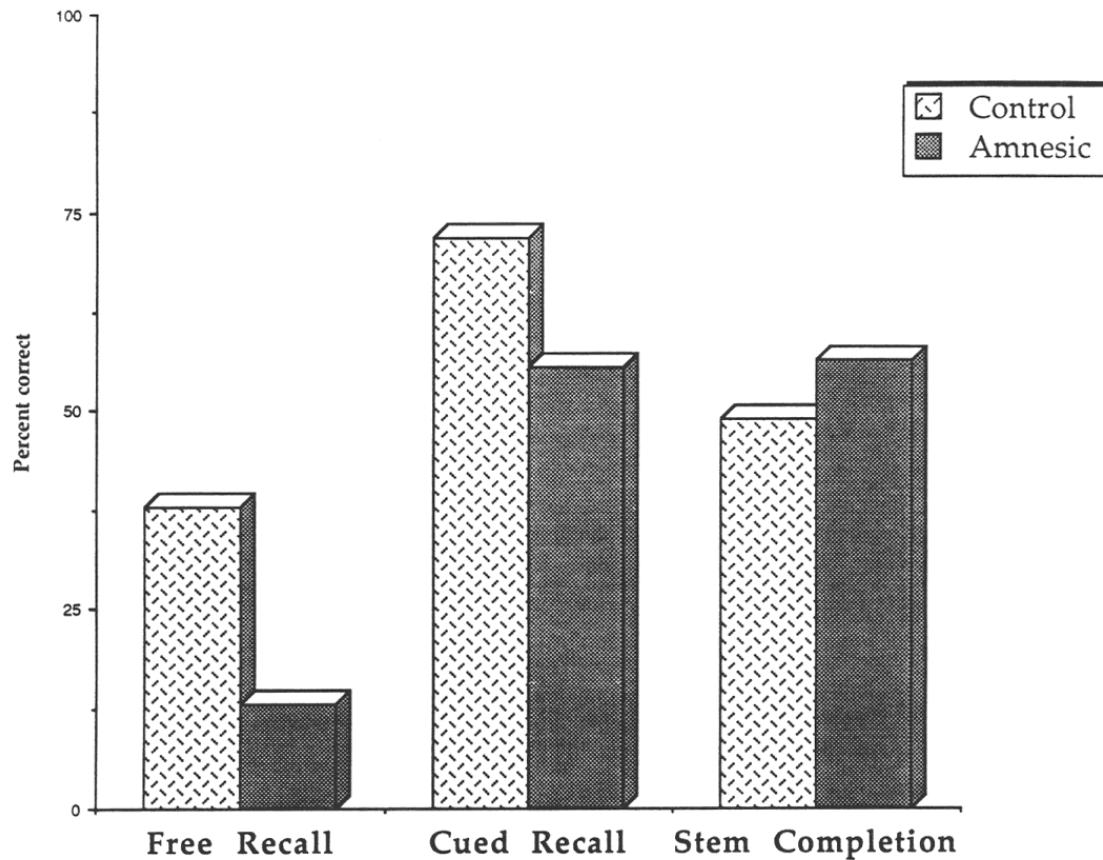
Nondeclarative memory

Explicit memory tests - tasks that explicitly instruct subjects to use memory (e.g., recall, recognition)

Implicit memory tests - tasks that do not explicitly instruct subjects to use memory

- Measure the unconscious influence of experience without asking to recall the past

Priming without awareness

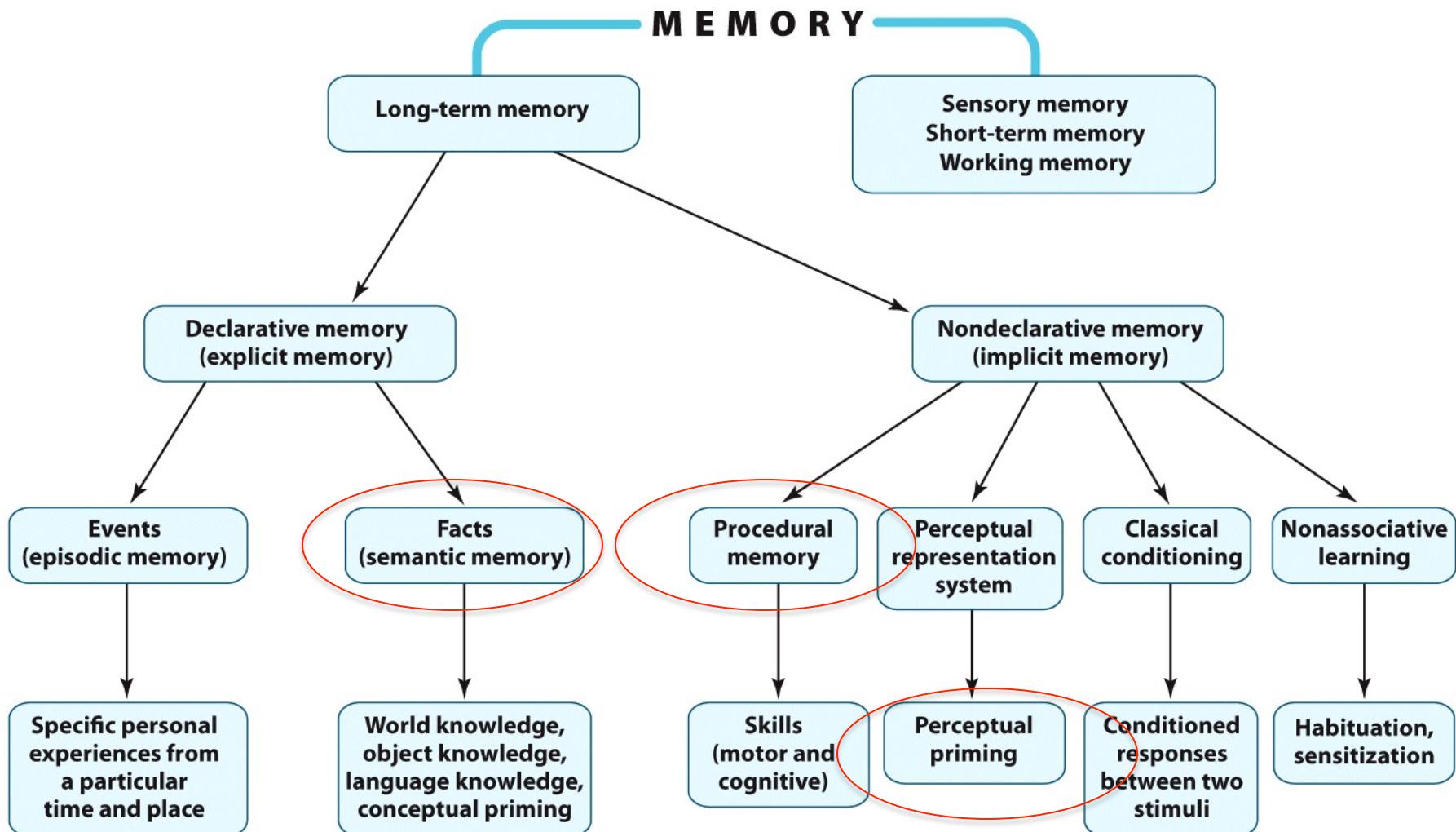


“List everything
you remember”

“List all the
animals that you
remember”

“Complete this
word stem”

Beyond Episodic Memory



Some semantic memory, procedural memory, and semantic priming in Amnesia, suggesting these memory subsystems may be less dependent on MTL

DRM Demo

Singularity

DRM Demo

Did you see it?

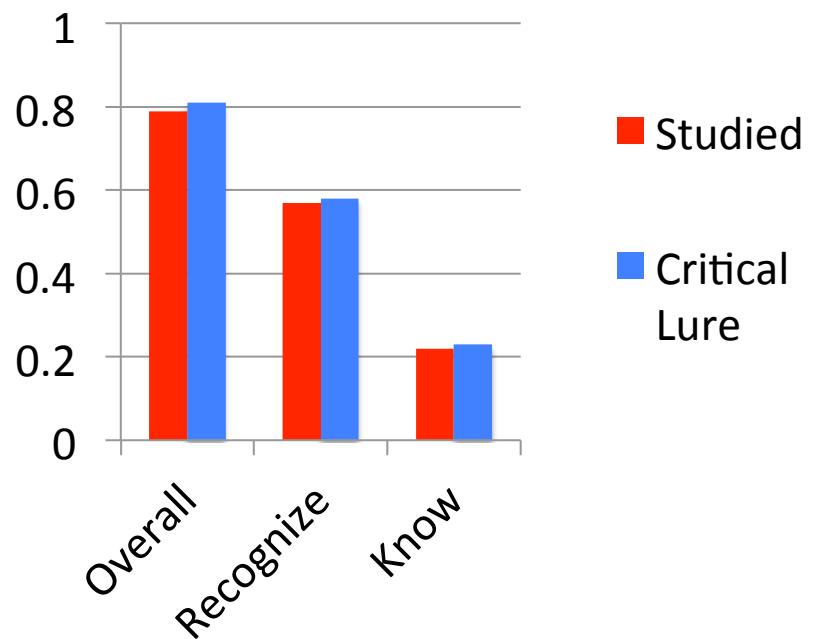
aardvark wake slumber sleep

rest tired awake dream snore
bed eat slumber sound comfort
wake night

DRM Paradigm

(Deese, 1959; Roediger & McDermott, 1995; Roediger & McDermott, 1995)

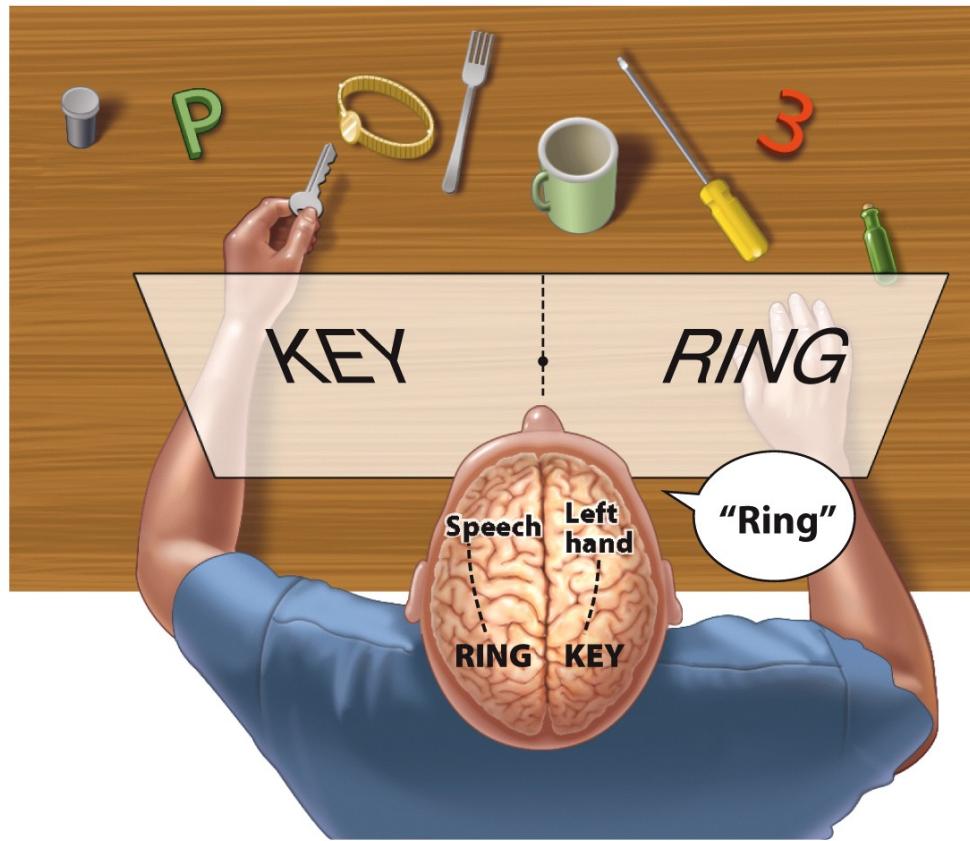
- **Recall:** ~ 40% recalled “sleep”
- **Recognition:** Remembering the **lure** (*sleep*) during recall strengthened participants memories of the lure during recognition
 - Participants claimed to “remember” the lure rather than merely “know” it had been on the list



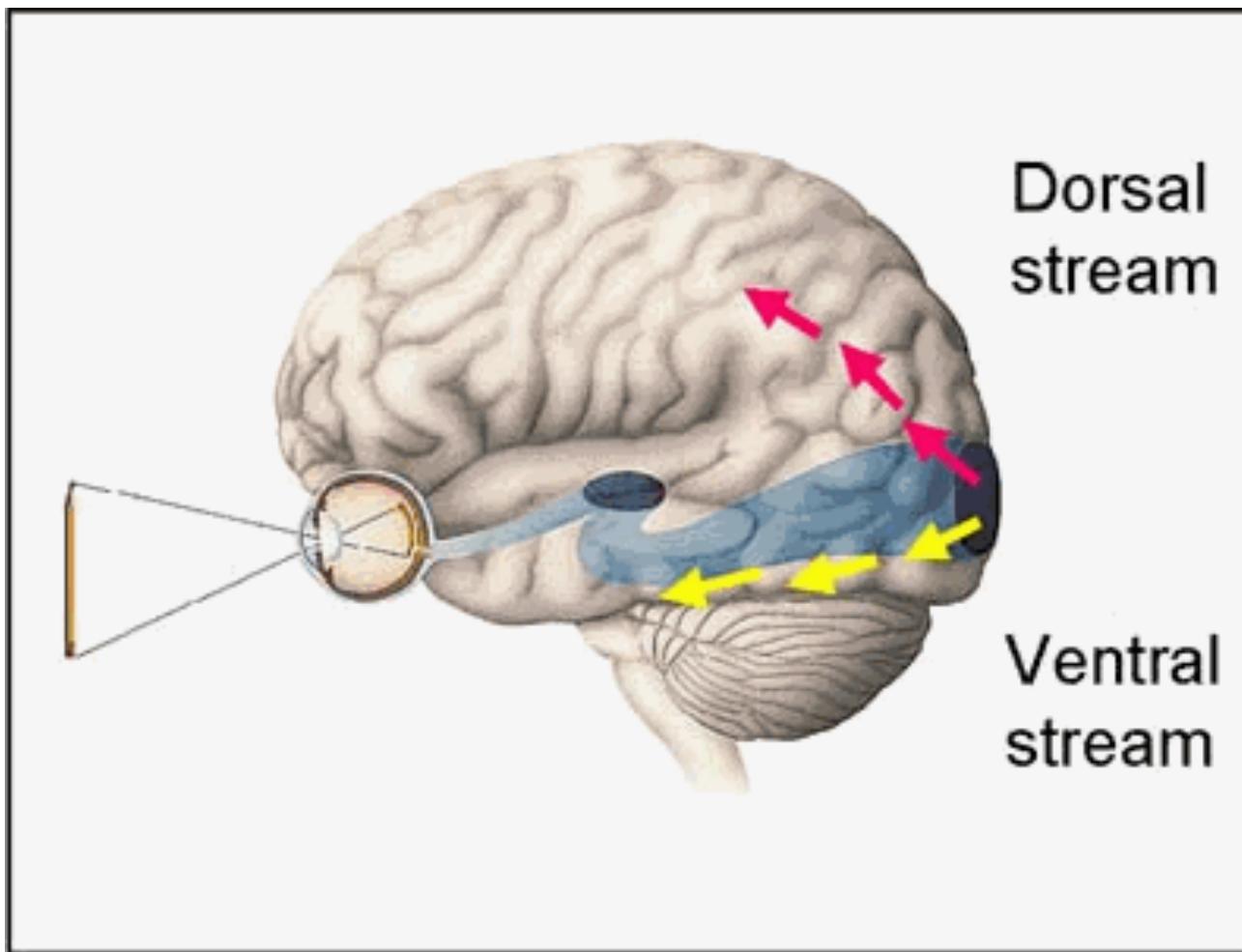
False Memories

- Memory is reconstructive
 - Sometimes we may “remember” things that never actually happened
 - And for these “false memories” we may be as confident in them as we are with actual memories
 - We are surprisingly unaware of how unreliable our memory can be and overly confident in the accuracy of our memories

- Left hemisphere – language production, right hand
- Right hemisphere – visuospatial, left hand

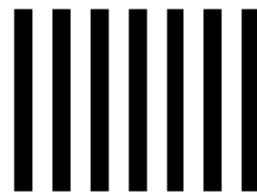


Dorsal and ventral pathway in both hemispheres

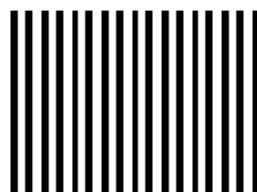


- LH - better at processing high spatial frequency information
 - Allows perception of details/edges (local)
- RH - better at processing low spatial frequency information
 - Allows perception of whole/overall shape (global)

LSF - Global



HSF - Local

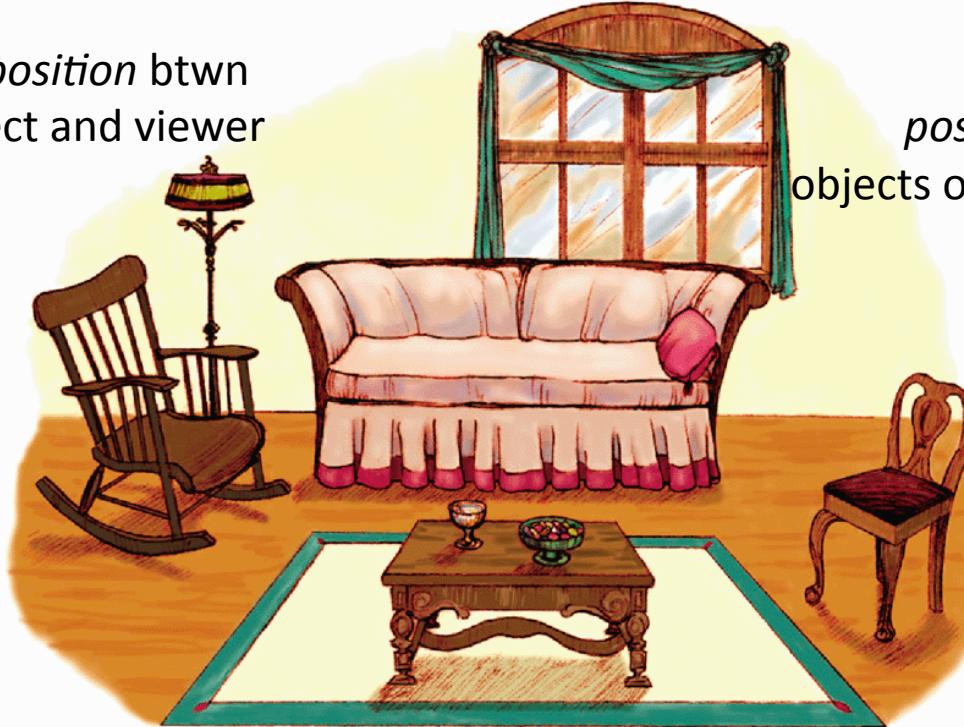


F	F	H H H H
F	F	H
F	F	H H H H
F	F	H
F	F	H

Categorical vs Coordinate Reps

Specify the *relative position* btwn objects or btwn object and viewer

Specify the *exact positions and distances* btwn objects or btwn object and viewer



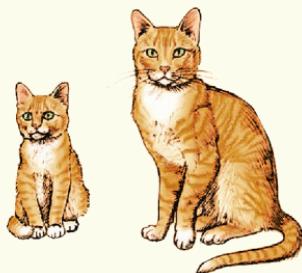
Categorical representation

Rocking chair left of couch
Dining chair right of couch

Coordinate representation

Rocking chair 2 feet from couch;
Rocking chair closer than
dining chair to couch

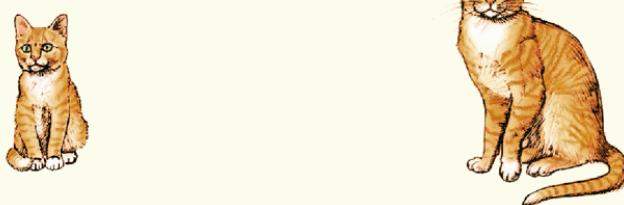
Target



Categorical transformation probe



Coordinate transformation probe



TASK: delayed match to sample

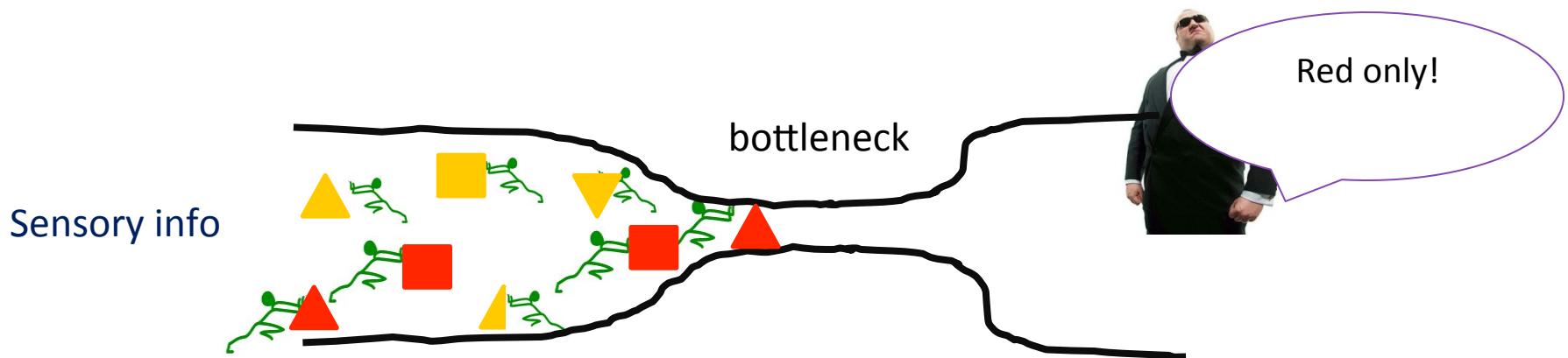
Categorical – left hemisphere

Coordinate – right hemisphere

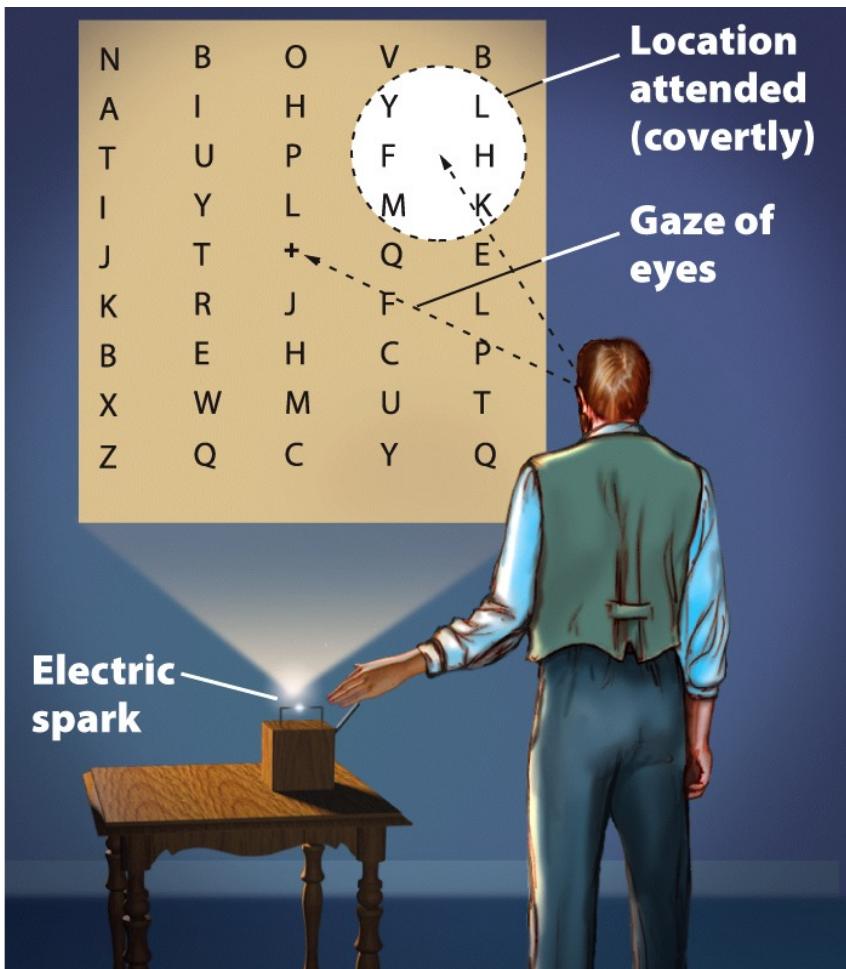
- Voluntary versus reflexive
 - Voluntary – conscious orienting (top-down)
 - Reflexive – unconscious orienting (bottom-up)
- Covert versus overt
 - Covert – eyes DO NOT focus on location of attention
 - Overt – eyes DO focus on location of attention

Limitations in processing can be described as a “bottleneck”

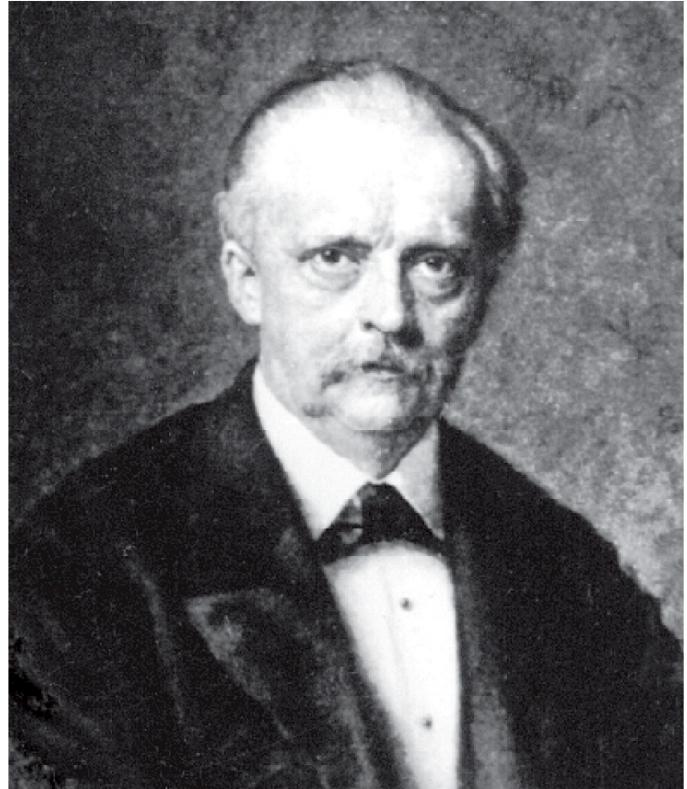
Attention selects goal relevant information



Could happen early or late



Hermann von Helmholtz (1821–1894)



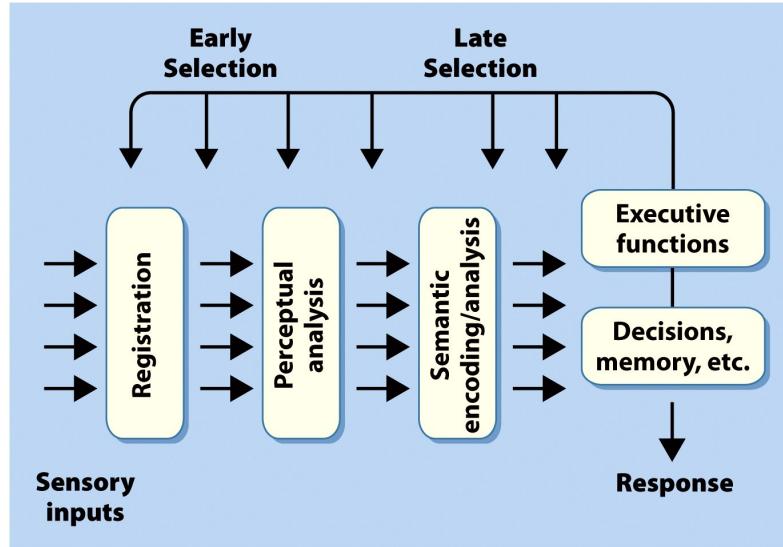
First experimental evidence of covert attention

Is attentional selection early or late?

Tune out spouse's voice



Volume control



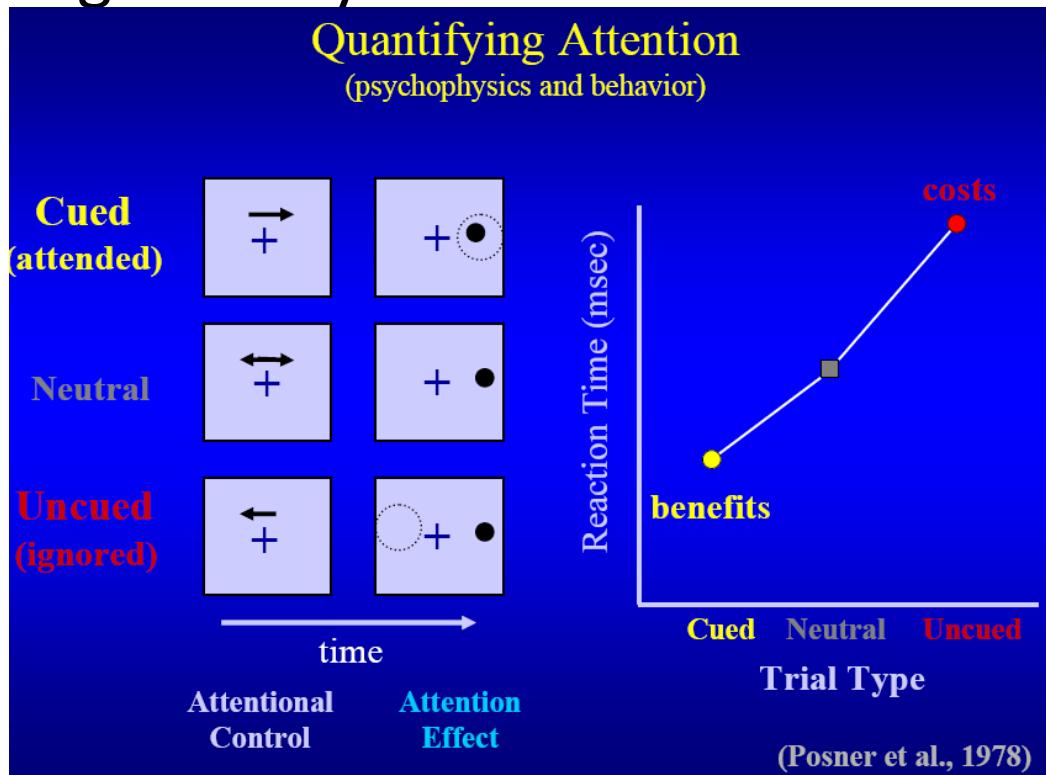
Still hear spouse's voice, but ignore it



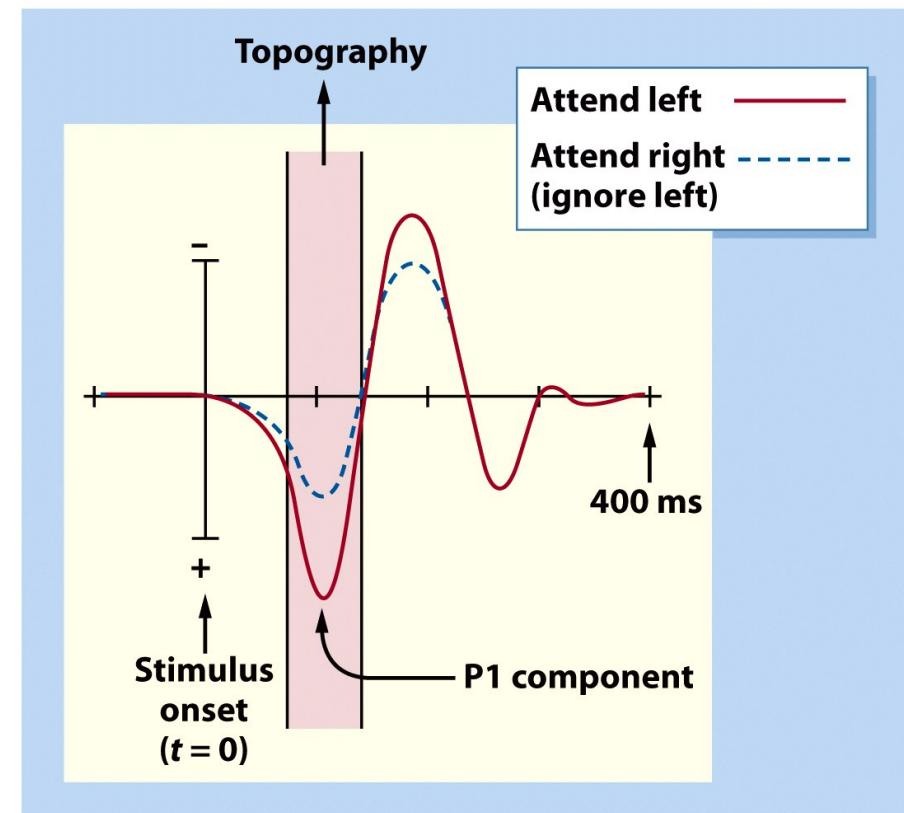
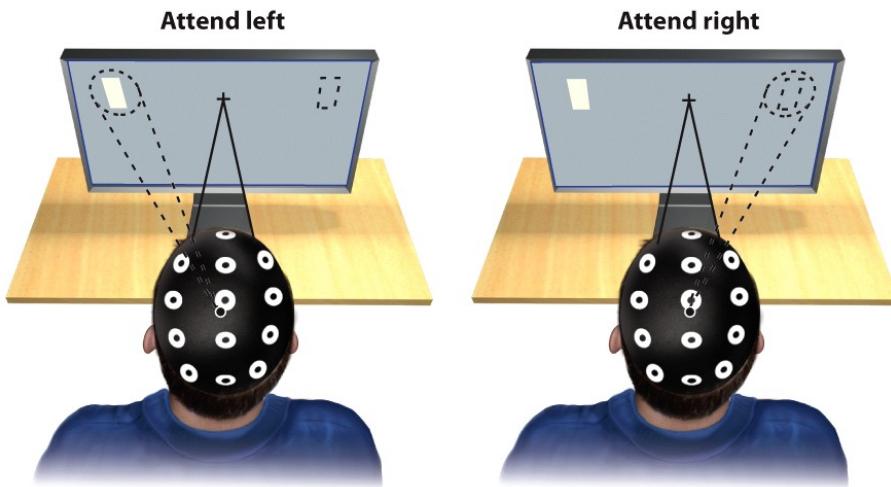
Early – select or dampen sensory information

Late – select or ignore information after semantic analysis is done

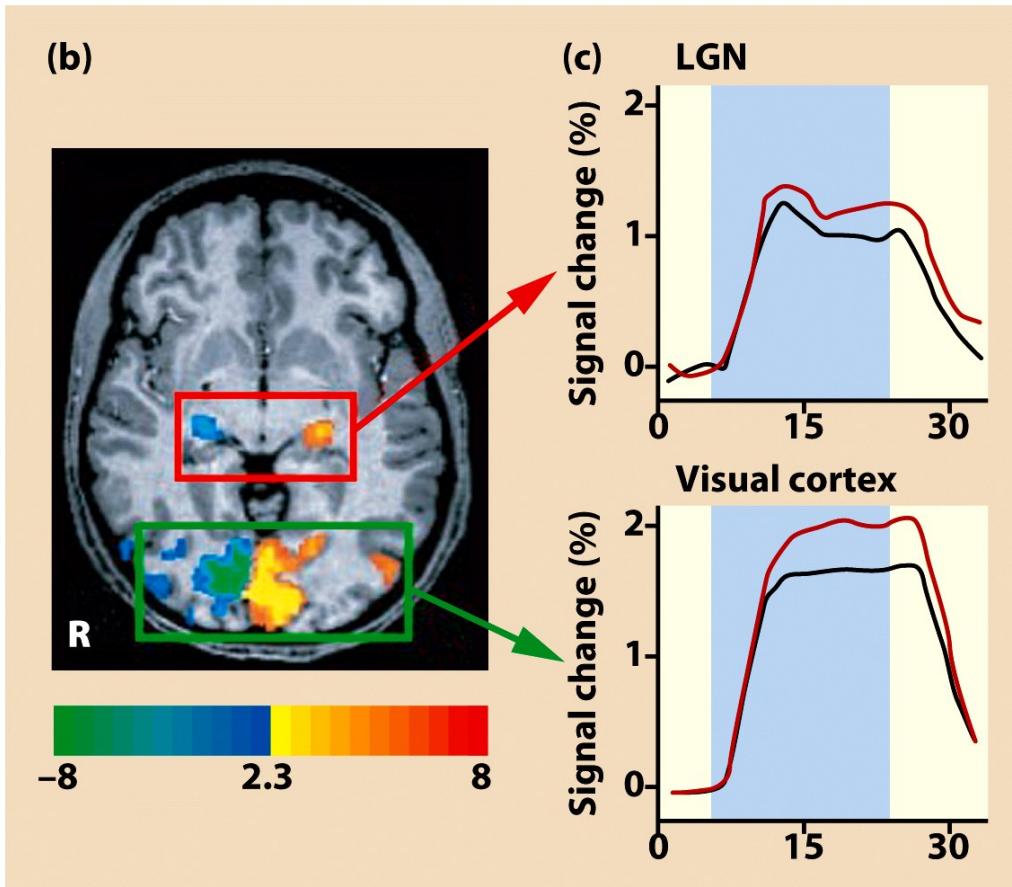
- Posner spatial cueing task
 - Faster to respond to a location if you are already attending there
 - Selecting sensory information



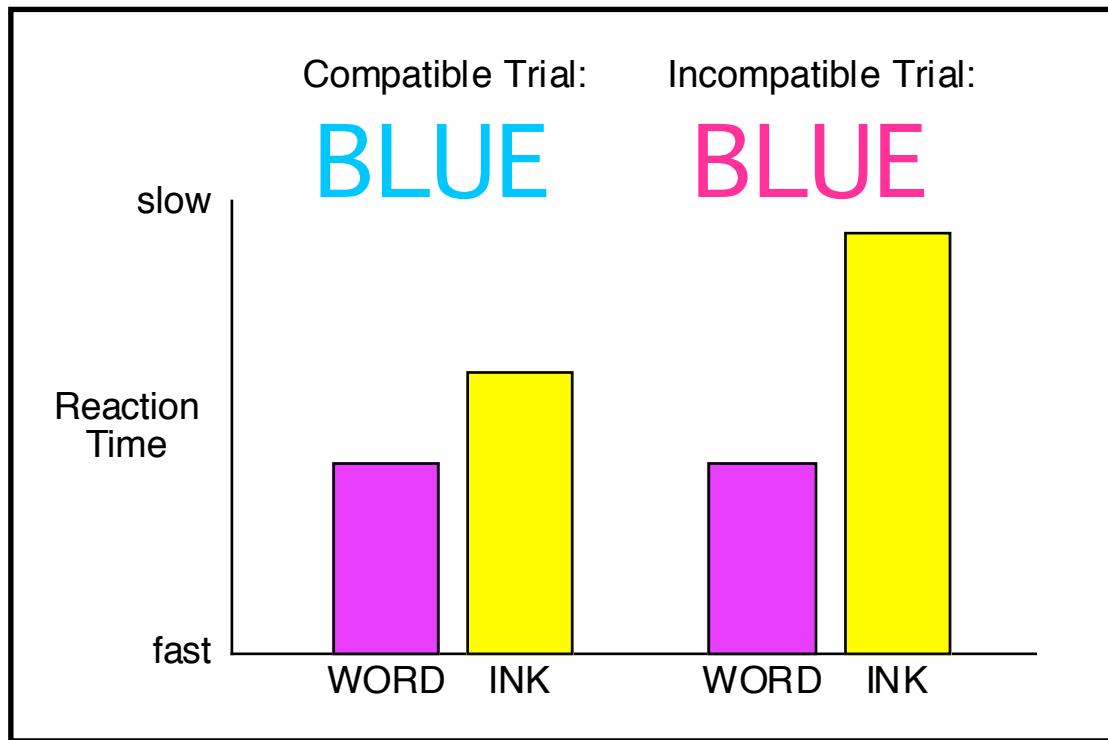
- ERPs
 - See brain activity difference as early as 70ms (early in perception)



- fMRI
 - See brain activity in LGN and V1 affected by attention

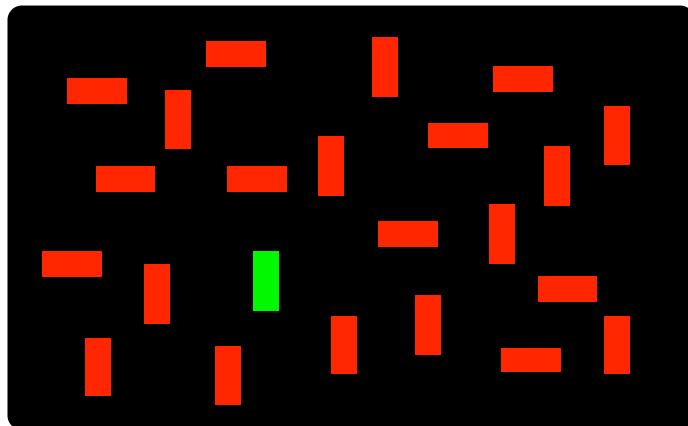


- Stroop
 - Attend to color (if blue, push button)
 - Semantic information interferes with task
 - Attention affected after semantic analysis





Feature Search



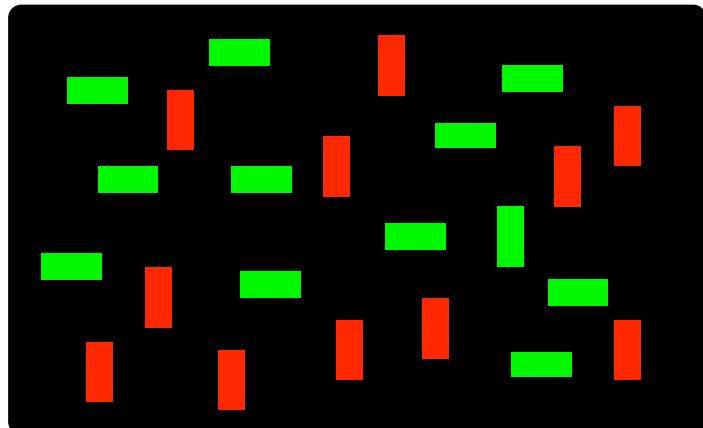
Reaction Time

— Target Present
- - - Target Absent

Pop out search

"Parallel Search"

Conjunction Search



Reaction Time

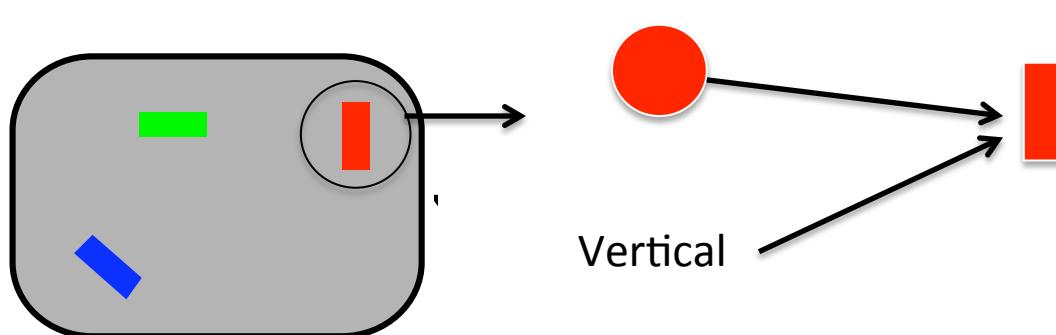
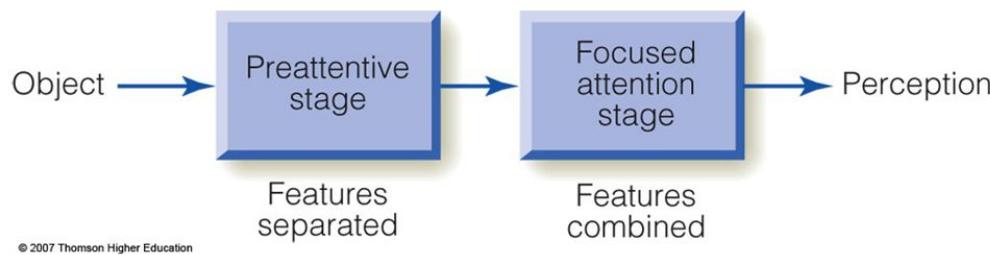
Number of Items

"Serial Search"

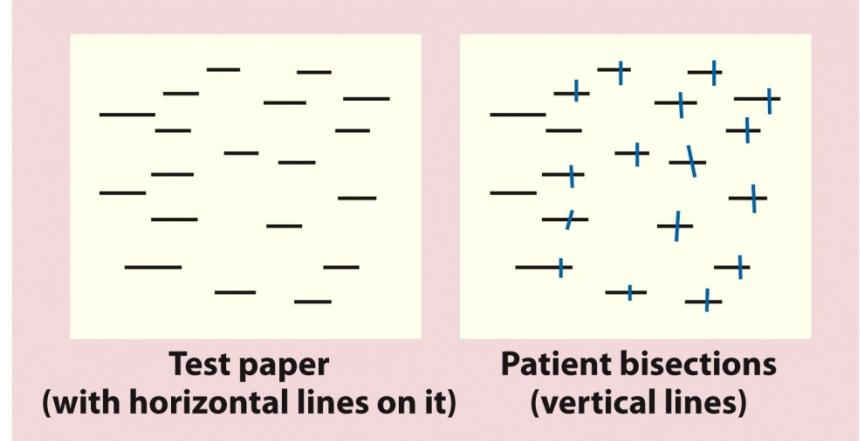
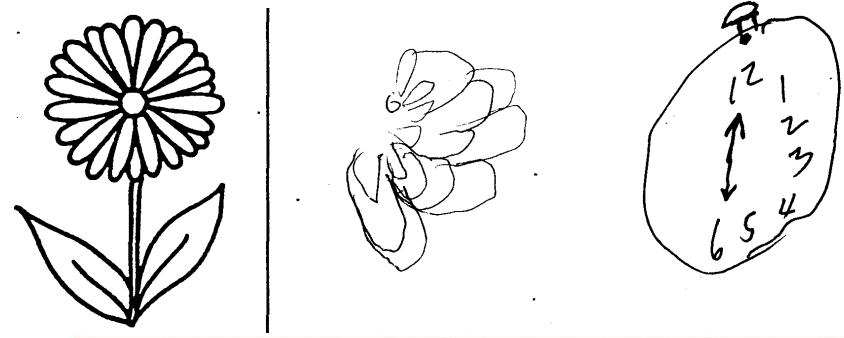
Number of Items

- Feature integration theory –
 - Preattentive stage – features *are not* bound together
 - ‘Free floating’, separate maps...
 - Attentive stage – features *are* bound together
 - ‘Localized’, one object file

Feature integration theory



- Ignore contralesional space
- Sensory perception (ability to “see”) intact
- But can direct voluntary attention to neglected side (slower though)
- Sensory-driven (reflexive) attention very impaired





- Detect and respond (by pointing) to the stimuli if presented one at a time, suggesting no major visual field defects
- However, see only the one in the right visual field when bilateral stimuli were presented simultaneously
- **Extinction:** the simultaneous presence of the stimulus in the patient's right field leads to the stimulus on the left of the patient being extinguished from awareness

Attention

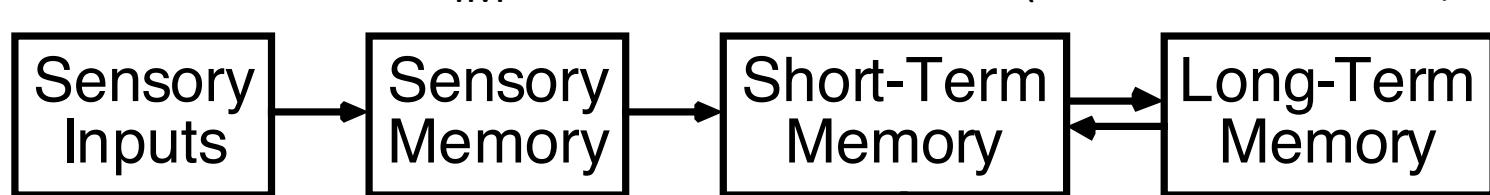
- Inattentional blindness – failure to notice the existence of an unexpected item
- Change blindness – failure to notice an obvious change



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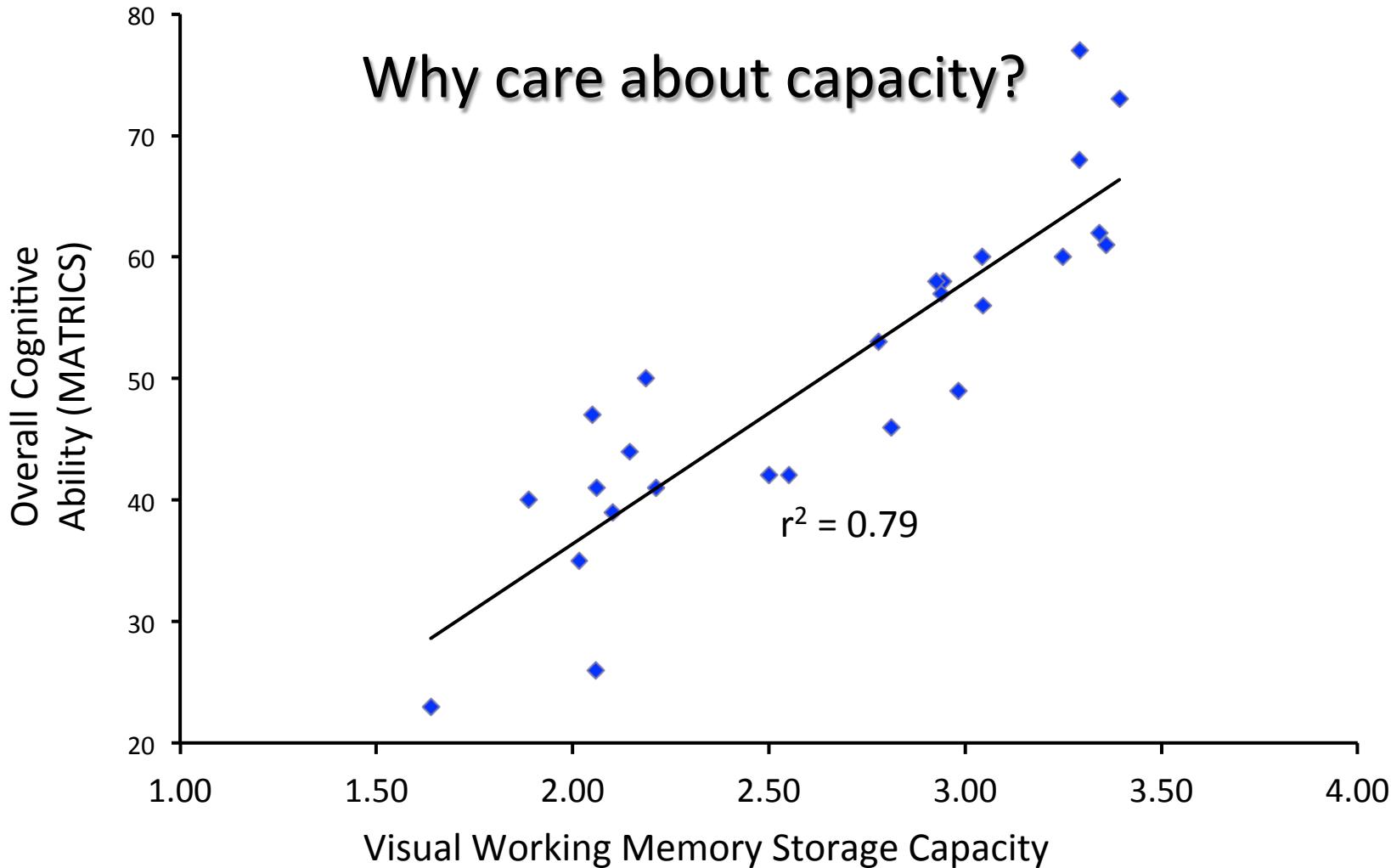
Memory systems

Modal/stage model
(Atkinson and Shiffrin, 1968)



	STM	LTM
Capacity	Limited (~3)	Unlimited Standing (1973)
Lifetime	Limited (forgetting after a few seconds) Peterson & Peterson	Unlimited (retrieval problem)

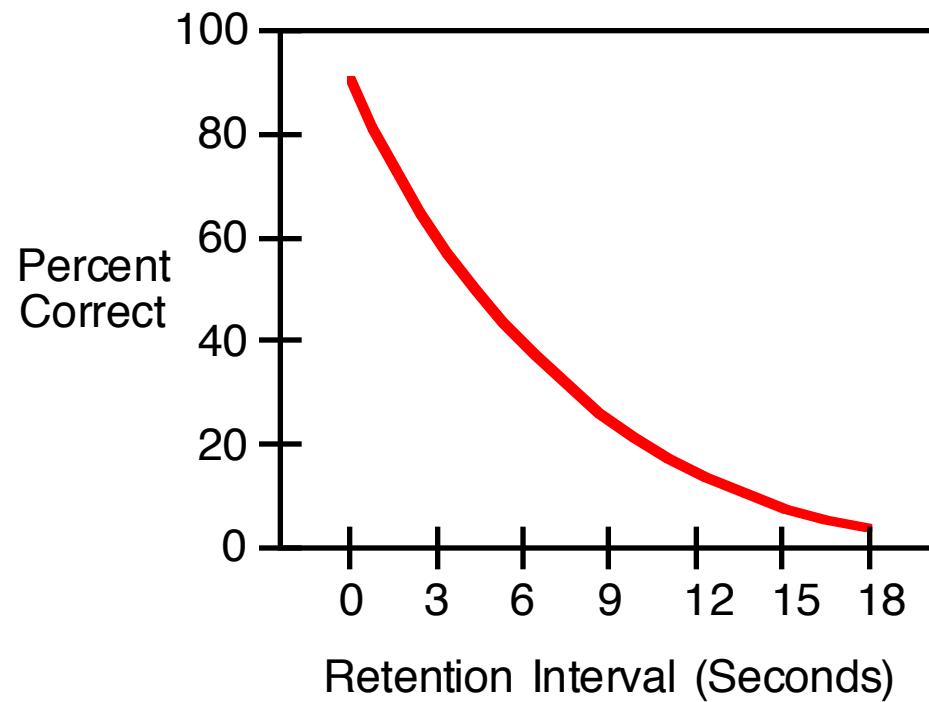
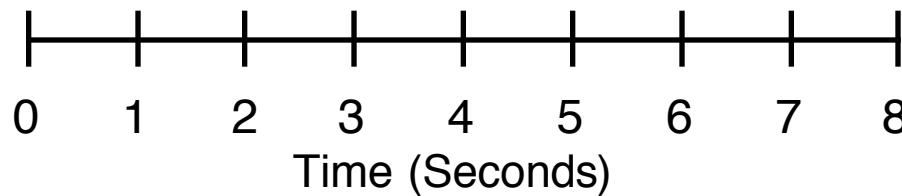
Capacity and Cognitive Ability



Gradual Decay in STM

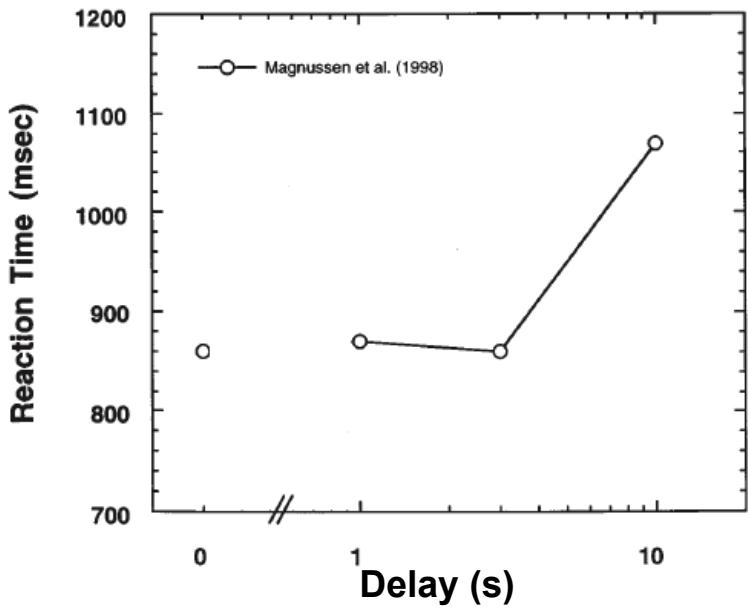
Subject
Experimenter

CHJ 506

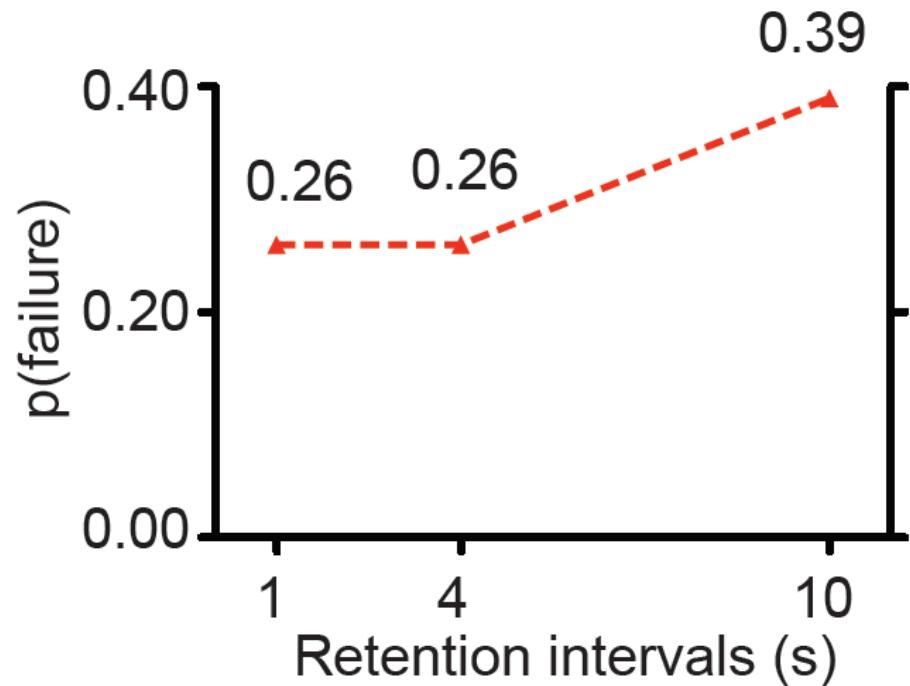


Sudden Forgetting in STM

Information maintained in STM for a few seconds

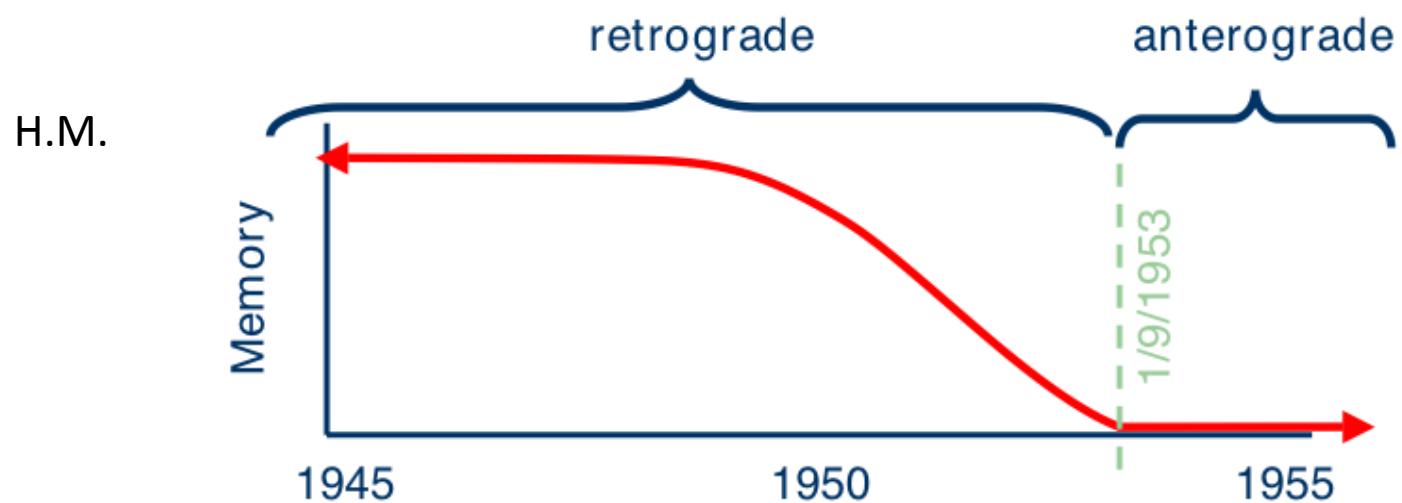


Magnussen et al. (1998)



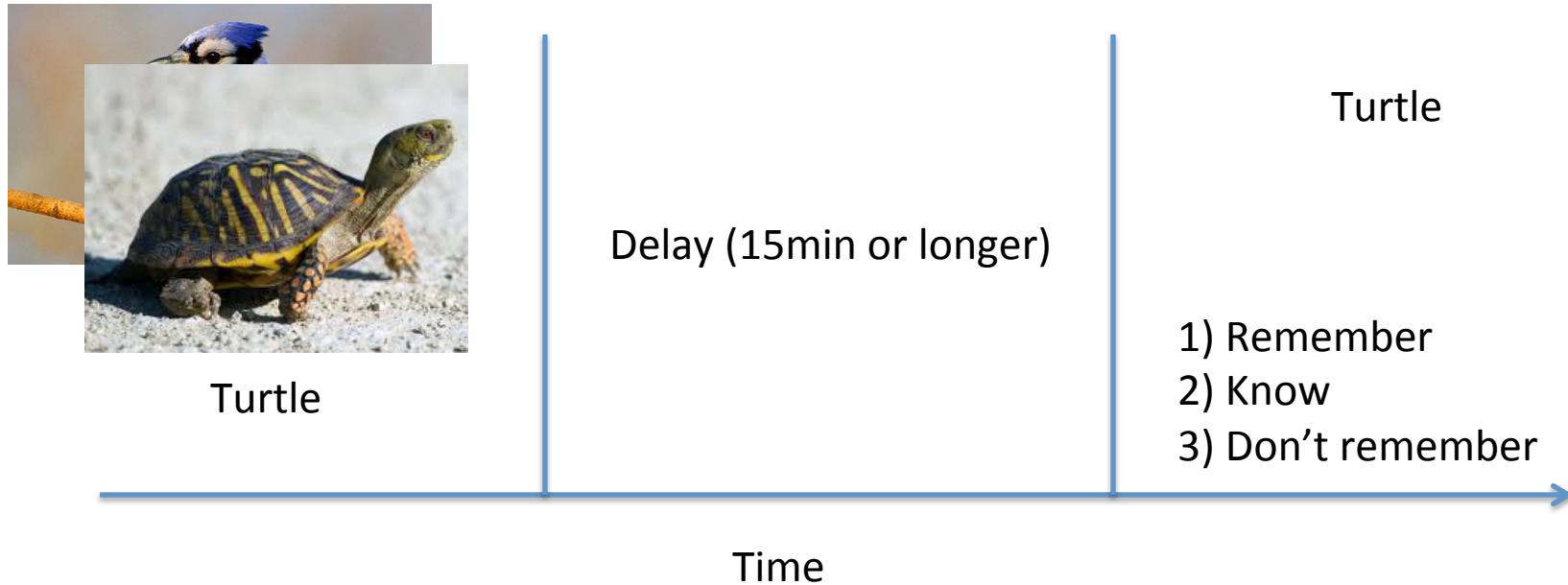
Zhang & Luck (2009)

Amnesia – loss of memory

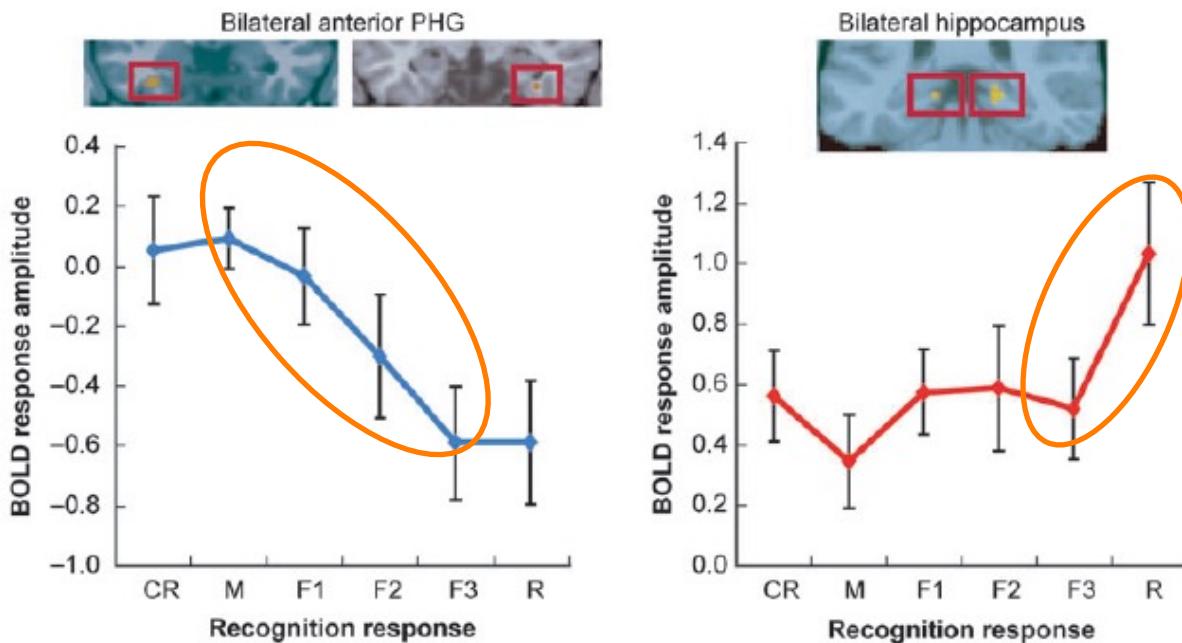


- Recollection (R): slow search process, qualitative information
 - Binary (either recollect or not)
- Familiarity (F): fast process, familiarity or a ‘sense of recency’
 - Graded/continuous (e.g., strong or weak feeling of knowing)

Remember/know paradigm



- Remember – can recall details (recollection)
- Know – know it was presented, but don't remember details (familiarity)

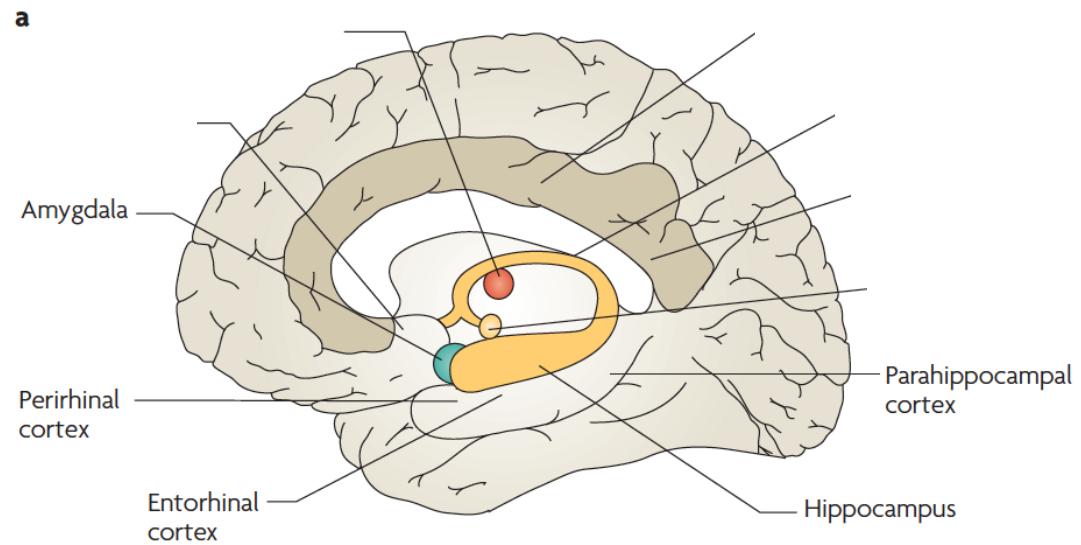


Remember (R) and Know (familiarity confidence F1,F2, F3) responses.

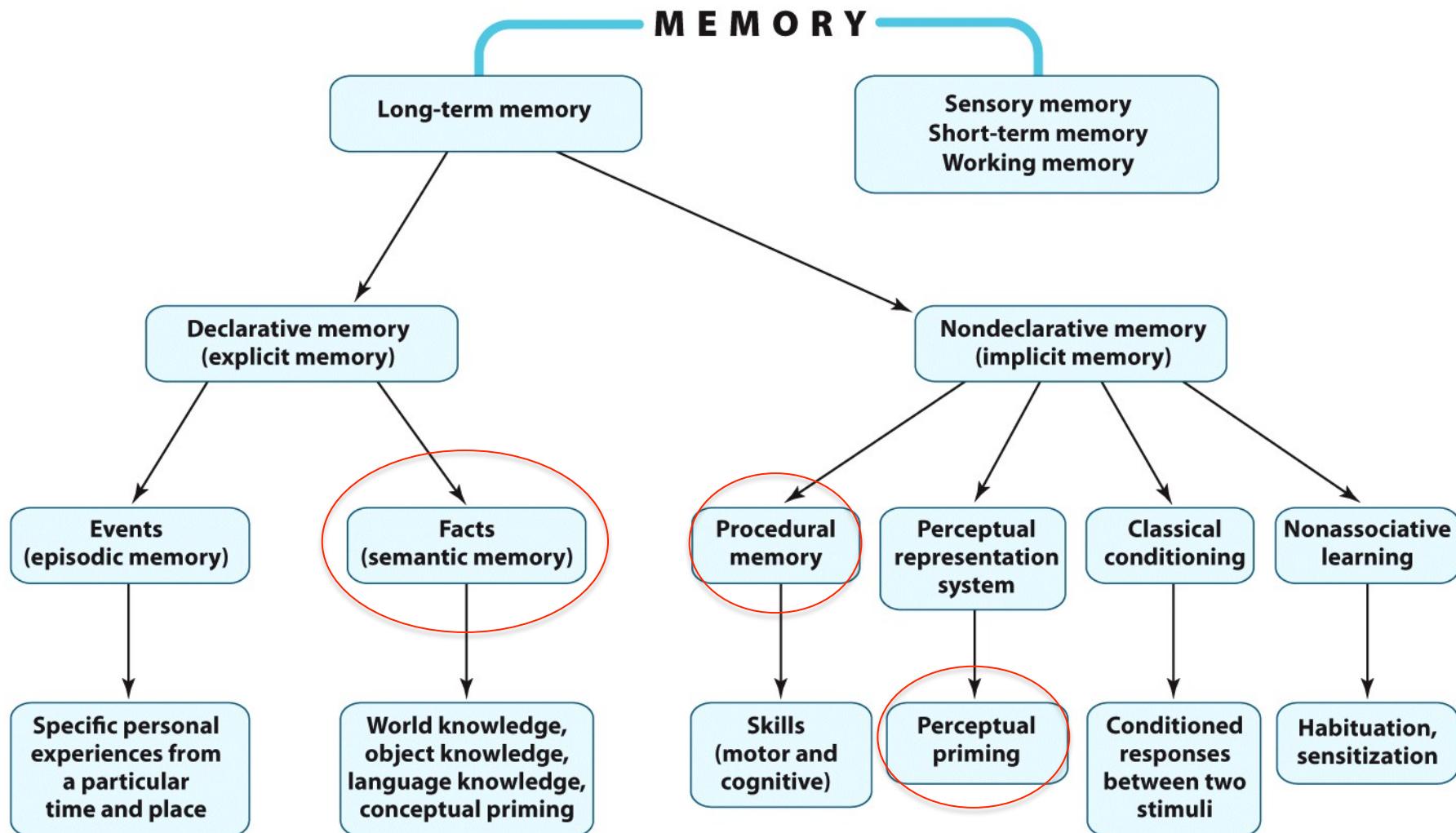
CR: correct rejection of lures; M: missed target

- Hippocampus was related to recollection, but not familiarity
- Parahippocampal gyrus activation scales with subjective familiarity judgments, and was related to familiarity, but not recollection

Medial temporal lobes (MTL)



- Hippocampus - R
- Parahippocampal gyrus - F
 - Entorhinal cortex
 - Perirhinal cortex - F
 - Parahippocampal cortex

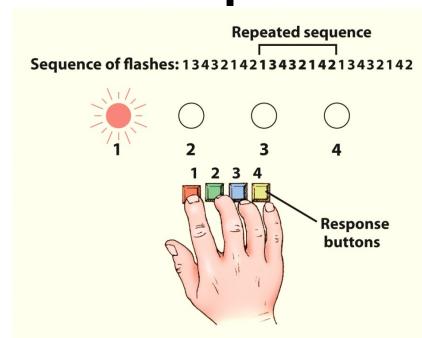


- Some newly acquired knowledge, although more difficult to learn
 - Popular culture: “who is Shrek?”
 - News events: “who is the president of the United States?”
- Maybe semantic memory relies less on medial temporal lobe for encoding.

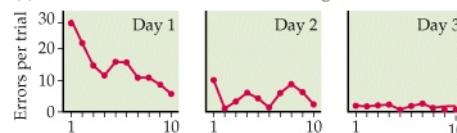


Implicit LTM tasks

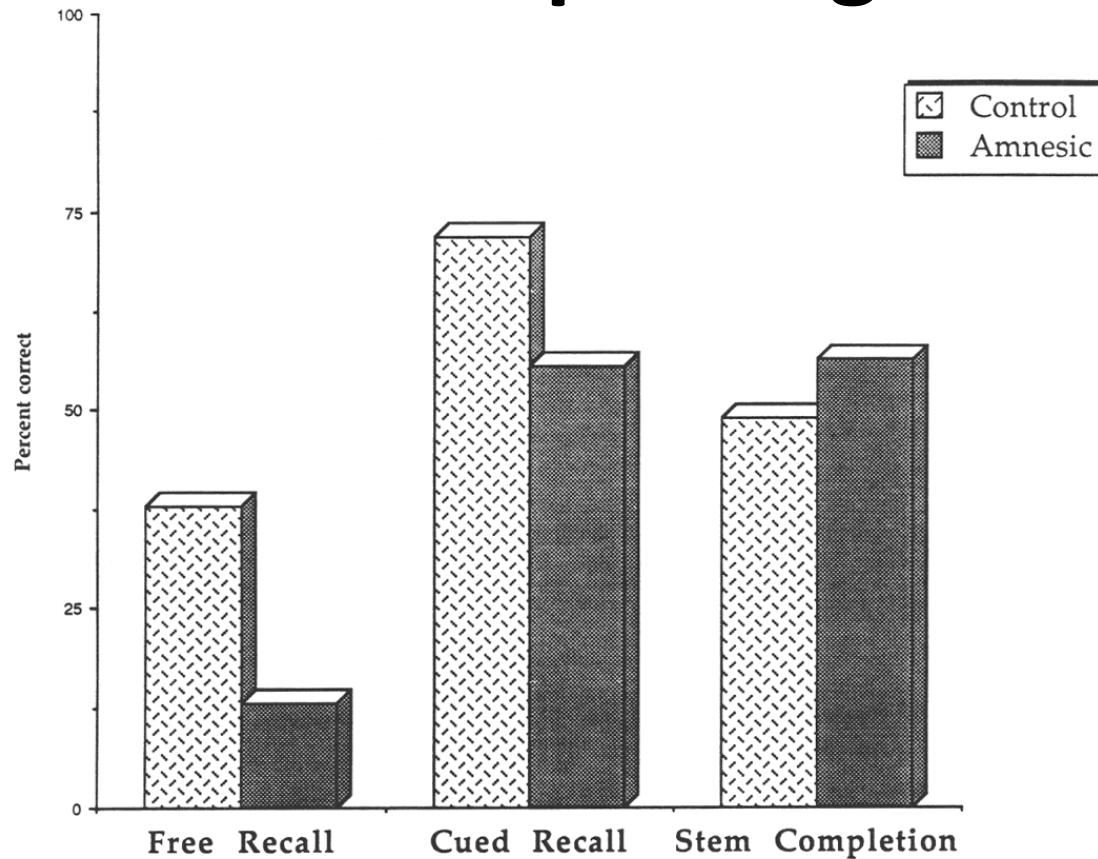
- Procedural memory intact in amnesia patients
 - Sequence learning – procedural
 - Mirror tracing - procedural



(b) Performance of H.M. on mirror-tracing task



Implicit LTM tasks - priming



“List everything
you remember”

“List all the
animals that you
remember”

“Complete this
word stem”

False memory

- DRM paradigm/ word recall task
 - Lists created based off of one word (sleep, bread, etc.)
 - Critical lure, intrusion word
 - ~40% people remember critical lure
 - Just as strong as memory of items in list

